

English Translation of Citation 1:

(prepared by the Japanese Patent Office)

Japanese Patent Publication No. 10(1998)-27148

Date of Publication: January 27, 1998

Japanese Patent Application No. 08(1996)-180722

Date of Application: July 10, 1996

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Title of Invention: Server System for Internet

What follows is a MACHINE-TRANSLATION of Citation 1 that has been prepared by the Japanese Patent Office.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the server system equipped with two or more sets of the servers which perform information dispatch through the Internet, and the management server which manages each of the server of these two or more bases.

[0002]

[Description of the Prior Art] On the Internet, the FTP server using FTP (File Transfer Protocol) which is a protocol for current and a file transfer, the WWW (World Wide Web) server using HTTP (Hyper Text Transfer Protocol) which is a protocol treating the multimedia

information to which text data and graphical data were intermingled, etc. are playing an active part as the information dispatch source.

[0003] On the other hand, access from a user concentrates on a popular server, and the Internet has the problem that information dispatch processing speed falls remarkably about the server, although many and unspecified global users are accessible networks and are spreading with vigor with current [ rapid ]. Moreover, it may not restrict that the target server is always working, but it may be said for failure, a maintenance activity, etc. that the server cannot be accessed.

[0004] In order to cope with such a situation, in the information dispatch server connected to the Internet, two technique described below is used well conventionally.

[0005] The 1st technique is an approach of giving each of two or more sets of servers the same information, as access does not concentrate on one server.

[0006] Specifically, the mirror site of a FTP server as shown in drawing 10 is equivalent to this.

[0007] In this drawing, FTP server A54 of the original copy site 53 owns former information, and FTP server B-52 of a mirror site 51 pulls out this information periodically from FTP server A54 of the original copy site 53, and it stores it in oneself. Thereby, even if the user who is going to access information using a terminal 110 has FTP server A54 in a high negative condition or a idle state, he can get required information from FTP server B-52. Moreover, if

it sees from FTP server A54, a result by which access to this server is distributed will be brought, and a load will be mitigated.

[0008] The 2nd technique is the approach of supplying this information from the server which is carrying out the cash advance from the information dispatch server, when the server (a cash advance is carried out) which stores temporarily the information which the user pulled out from the information dispatch server tends to be arranged and another user tries to access on the access path to an information dispatch server as opposed to that information.

[0009] For example, the proxy server arranged on the access path to a WWW server as shown in drawing 11 is equivalent to this.

[0010] In this drawing, a proxy server 62 will be accessed to the WWW server 61 instead of a terminal 110, if the access request from a terminal 110 which is going to acquire the information on the WWW server 61 is received. Then, a proxy server 62 both returns this information to the terminal 110 which holds the information acquired by this deputy access as cache data 63 and which emitted the access request. Then, a proxy server 62 performs return processing using the cache data 63 which oneself owns, without accessing this WWW server 61, if the access request to this information is received from other terminals (graphic display abbreviation). By this, the count of access to the WWW server 61 will be mitigated.

[0011]

[Problem(s) to be Solved by the Invention] However, in the 1st

technique mentioned above, although it realizes about the cure against unloading of each server, and the backup function at the time of stopping one server, in order for a terminal utilization user to acquire required information, one of an original copy site and the mirror sites must be chosen by the user side. A user will be forced decision with which server such selection is dramatically complicated and vacant.

[0012] Moreover, in the 2nd technique mentioned above, although the count of access to the server ( drawing 11 : WWW server 61) used as the information source is mitigated, the server for caches ( drawing 11 : proxy server 62) cannot access this at the time of a halt of this server, but information offer to a user becomes impossible as a result.

[0013] It is in offering the server system for the Internet which can aim at backup at the time of the access distribution in a server group, and failure generating etc., without the object of this invention forcing it actuation special to a terminal utilization user in view of such a trouble.

[0014]

[Means for Solving the Problem] In the server system equipped with two or more sets of the servers which perform information dispatch through the Internet, and the management server which manages each of the server of these two or more bases when this invention for attaining the above-mentioned object was caused like 1 voice The server group which consists of said two or more sets of servers to

which a part of server [ at least ] of a base disseminates two or more same information is constituted. Said management server The host name given to said server group, and each address for a communication link of two or more sets of said servers which constitute said server group, The managed table on which the selection information used in case the target address for a communication link is chosen from these addresses for a communication link was stored, If the address for a communication link corresponding to said host name is required through said Internet A selection means to choose any of the address for a communication link stored in said managed table they are according to the content of said selection information, The server system characterized by having a name service means to transmit the address for a communication link which said selection means chose to the demand origin of said address for a communication link is offered.

[0015] In the server system which was equipped with two or more sets of the servers which perform information dispatch through the Internet, and the management server which manages each of the server of these two or more bases according to the mode of others of this invention for attaining the above-mentioned object The server group which consists of said two or more sets of servers to which a part of server [ at least ] of a base disseminates two or more same information is constituted. Said management server The identifier for server groups which expresses said server group to a meaning on said Internet, Said identifier for servers which constitutes

said server group from on said Internet and which expresses two or more each of the server of a base to a meaning, The managed table on which the selection information used in case the target identifier for servers is chosen from these identifiers for servers was stored, If the access request using said identifier for server groups is received through said Internet A selection means to choose any of said identifier for servers they are according to the content of said selection information, While transmitting the information which performed access to said server using the identifier for servers which said selection means chose, and was acquired by this access to the demand origin of said access request This information is held temporarily and the server system characterized by having a deputy access means to transmit the information concerned which holds again the access request using said identifier for server groups to the reception beam case to the demand origin of the access request concerned is offered.

[0016]

[Embodiment of the Invention] Hereafter, 1 operation gestalt of this invention is explained.

[0017] The whole server system configuration of this operation gestalt is shown in drawing 1 .

[0018] This server system has two or more information dispatch server groups (information dispatch server groups 1091, 1092, --, 109N) which perform information dispatch through the Internet 111, and the management server 101 which manages access from a terminal

performed to these information dispatch server groups. The information dispatch server groups 1091, 1092, --, 109N consist of two or more sets of servers, respectively. The information dispatch server group 1091 consists of information dispatch servers 10911-1091N which have the same information. About other information dispatch server groups as well as this, each information dispatch server owns information peculiar to the server group. In addition, what is necessary is just to add suitably the server which has the same information, when access to a specific information dispatch server group increases. The management information for managing the information dispatch server groups 1091, 1092, --, 109N is stored in the name database (name DB) 103. The DS of a name DB103 is shown in drawing 2.

[0019] The two storing fields, the server name field 21 and the server address field 22, exist in a name DB103. With this operation gestalt, beforehand, the host name is given to information dispatch server groups [ 1091, 1092, -- 109N ] each, and these host names are stored in the server name field 21. So to speak, this host name is a host name representing each information dispatch server of that information dispatch server group, and decides to call this host a representation host name for convenience hereafter.

[0020] On the other hand, all the information dispatch servers prepared in this server system have the server address of a proper, respectively, and are stored in the server address field 22 in the form whose server addresses of these settled for every information

dispatch server group. "-" of the server name field 21 means that it is the same as the content stored in the column on it. The address of an information dispatch server is the address for a communication link used in case it communicates on the Internet 111, and, specifically, is an IP address for performing a TCP/IP communication link.

[0021] In addition, the representation host name given to information dispatch server groups [ 1091, 1092, --, 109N ] each does not change to the usual host name, i.e., the host name which becomes settled uniquely on DNS (Domain Name System), at all.

[0022] Here, a domain (Domain) is explained briefly.

[0023] When construction of the Internet starts, in order to identify each computer connected to the network, unitary management of the host name and IP address was carried out in the predetermined organization. The number of computers was [ hundreds of ] of order at the beginning, and it was also possible to have registered the host name and IP address of all computers into one file.

[0024] However, the limitation of this approach became clear immediately with network amplification. While the new registration and updating which are performed one after another take immense time amount, the rating of a managing agency increases and settlement has stopped namely, sticking as a result.

[0025] The domain was the concept proposed in order to solve such a problem, and it was introduced in order to carry out naming of many computers which exist all over the world to a meaning.



[0026] The domain space of the Internet is managed hierarchical, and DNS is designed so that this administrative information may be matched. In the Internet, a DNS server with the information on each domain is distributed, and it is managed hierarchical like domain space. The management server of this operation gestalt can also be considered to be a kind of this DNS server.

[0027] In drawing 2, the representation host name (serv.bbb.aaa) which shows the information dispatch server group 1091, and the representation host name (other.bbb.aaa) which shows the information dispatch server group 1092 are illustrated. All are registered into the server group control table 105 also about the representation host name of information dispatch server groups other than these. The server addresses including the server address 192.128.16.1 of the information dispatch server 1091 of each information dispatch server which constitutes the information dispatch server group 1091 are stored in the form matched with the representation host name (serv.bbb.aaa) of the information dispatch server group 1091. The server address of each information dispatch server which constitutes the information dispatch server group 1092 is stored in the form matched with the representation host name (other.bbb.aaa) of the information dispatch server group 1092.

[0028] The name service section 102 in which the management server 101 performs the response processing in response to the name service demand from the outside, The name DB retrieval processing section

106 which is in the name service section 102 and performs retrieval and an extract of applicable information from a name DB103, From the name service section 102, the server group information 107 which it is as a result of [ of the name DB103 by the name DB retrieval processing section 106 ] retrieval Reception, One server is chosen from the server group which the server group information 107 shows, and it has the server selection section 104 notified to the name service section 102 by making the result into the selection server information 108, and the server group control table 105 which the server selection section 104 refers to in case a server is chosen.

[0029] The management server 101 which has the above configuration exists on same LAN (Local Area Network)112 as the information dispatch server groups 1091-109N, and this LAN112 has connected it to the Internet 111. The countless terminal has accessed the Internet 111 and each user can access each information dispatch server group of this server system using each terminal. In addition, the terminal 110 is typically illustrated by drawing 1 .

[0030] Next, the case where the information dispatch server group 1091 is accessed from a terminal 110 is taken for an example, and actuation of this server system is explained. Here, the talk is advanced as that to which the user knows beforehand the representation host name given to the information dispatch server group 1091.

[0031] A user inputs the representation host name (serv.bbb.aaa) of the information dispatch server group 1091 into a terminal 110

first. A terminal 110 asks the management server 101 the server address corresponding to a representation host name in response to this alter operation. Specifically, the information which shows a representation host name (serv.bbb.aaa) is sent to the management server 101 in this case. So far, it is the same as the case where a name service is required of the conventional DNS server.

[0032] The name service section 102 of the management server 101 will start the name DB retrieval processing section 106, if the information which shows, the address inquiry (serv.bbb.aaa), i.e., the representation host name, from a terminal 110, is received. The name DB retrieval processing section 106 performs name DB retrieval processing shown in drawing 5.

[0033] As shown in this drawing, the name DB retrieval processing section 106 searches a name DB103 for the representation host name sent from the terminal 110 to a key first (step 51 (S51)). Thereby, all the server addresses corresponding to the representation host name used as the key are extracted. Here, the server address (192.128.16.1, 192.128.16.4, --) corresponding to a representation host name (serv.bbb.aaa) is extracted. Next, the name DB retrieval processing section 106 notifies all the found server addresses to the server selection section 104 as server group information 107 with a previous representation host name (S52). The server selection section 104 chooses the one optimal server for making information offer perform with reference to the server group control table 105 according to the content. Suppose that the detail

of this selection processing is mentioned later. The selected host name and selected server address of a server are sent to the name service section 102 as selection server information 108. The name service section 102 processes this server address as a retrieval result, and transmits this server address to a terminal 110 as response processing of an address inquiry demand after that (S53).

[0034] The terminal 110 to which the server address was notified can perform information access now from the management server 101 directly to the server after this.

[0035] Thus, since the optimal server for performing information dispatch out of the information dispatch server group whenever a certain server group from information is accessed is chosen according to this operation gestalt, access from a terminal will be distributed within the information dispatch server group as a result.

[0036] In addition, at the terminal 110, although not explained especially, it succeeds in configuration beforehand so that the representation host name sent out from this terminal 110 may reach the management server 101 through DNS which is not illustrated direct or here. About this, since it is usually carried out on DNS, it omits for details.

[0037] Moreover, with the above-mentioned operation gestalt, although the information dispatch server group and the management server are connected to the same LAN, this does not mean that an information dispatch server group must exist on the same LAN as a

management server. For example, each server of an information dispatch server group may be connected to the location of the arbitration on the Internet.

[0038] Below, the operation gestalt of others of this invention is explained.

[0039] The whole server system configuration of this operation gestalt is shown in drawing 3.

[0040] The management server 301 of this server system plays the role of the so-called proxy server which performs information access of as opposed to a WWW server for access to a WWW server from a terminal, and the cash advance of the access information instead of a direct receptionist and a terminal in access to the WWW (World Wide Web) server which disseminates various multimedia information by the Internet.

[0041] 1091-109N are information dispatch server groups which have the same information and which consist of server two or more bases among drawing. Here, the information dispatch server group 1091 consists of two or more sets of WWW servers, and the information dispatch server group 1092 consists of two or more sets of FTP servers.

[0042] In the management server 301, 302 responds to information access from a terminal. The deputy access section which performs deputy access to an information dispatch server, return to the terminal of access information, and momentary maintenance (cache processing) of the access information, and 306 The server list

retrieval processing section which is in the deputy access section 302 and performs retrieval and an extract of applicable information from the server list 303, and 304 From the deputy access section 302, the server group information 307 which it is as a result of [ of the server list 303 by the server list retrieval processing section 306 ] retrieval Reception, It is the server group control table which chooses one server from the server groups which the information shows, and the server selection section which notifies the result to the deputy access section 302 as selection server information 308, and 305 have in the server selection section 304, and is referred to in the case of selection processing of a server.

[0043] The DS of the server list 303 is shown in drawing 4 .

[0044] As shown in drawing 4 , the two storing fields, the representation server name field 41 and the server name field 42 in a server group, exist in the server list 303. With this operation gestalt as well as the above-mentioned, the host name (representation host name) is given to information dispatch server groups [ 1091, 1092, --, 109N ] each, and these representation host names are stored in the server name field 41. "-" of the representation server name field 41 means that it is the same as the content stored in the column on it. Moreover, the host name of each server which constitutes the information dispatch server group shown by the representation host name stored in the representation server name field 41 is stored in the server name field 42 in a server group.

[0045] The representation host name (www.bbb.aaa) which shows the information dispatch server group 1091, and the representation host name (ftp.bbb.aaa) which shows the information dispatch server group 1092 are illustrated by drawing 4. The host names including the host name (serv1.www-c.bbb.aaa) of the information dispatch server 10911 of each information dispatch server which constitutes the information dispatch server group 1091 are stored in the form matched with the representation host name (www.bbb.aaa) of the information dispatch server group 1091. The host name of each information dispatch server which constitutes the information dispatch server group 1092 is stored in the form matched with the representation host name (ftp.bbb.aaa) of the information dispatch server group 1092.

[0046] The information dispatch server groups 1091-109N and the access control server 301 are connected to same LAN (Local Area Network) 112, respectively. This LAN 112 is connected to the Internet 111. A user's terminal 110 used in case the information which the information dispatch server groups 1091-109N are disseminating comes to hand has accessed the Internet 111.

[0047] The case where the information which each server of the information dispatch server group 1091 is disseminating next comes to hand at a terminal 110 is taken for an example, and actuation of this server system is explained. Here, the talk is advanced as that to which the user knows beforehand the representation host name given to the information dispatch server group 1091.

[0048] A user inputs the representation host name (www.bbb.aaa) of the information dispatch server group 1091 into a terminal 110 first. A terminal 110 requires access to delivery and the information dispatch server group 1091 of the management server 301 for a representation host name in response to this alter operation. So far, it is the same as the case where access is required of the conventional proxy server.

[0049] The deputy access section 302 of the management server 301 will start the server list retrieval processing section 306, if a representation host name (www.bbb.aaa) is received from a terminal 110. The server list retrieval processing section 306 performs server list retrieval processing shown in drawing 6.

[0050] The server list retrieval processing section 306 searches the server list 303 for the representation host name sent from the terminal 110 to a key first (step 61 (S61)). Thereby, all the host names corresponding to the representation host name used as the key are extracted. Here, the host name (serv1.www-c.bbb.aaa, serv4.www-c.bbb.aaa, --) corresponding to a representation host name (serv.bbb.aaa) is extracted. Next, the server list retrieval processing section 306 notifies all the found host names to the server selection section 304 as server group information 307 with a previous representation host name (S62). The server selection section 304 chooses the one optimal server for making information offer perform with reference to the server group control table 305 according to the content. Suppose that the detail of this selection



processing is mentioned later. The host name of the selected server is sent to the deputy access section 302 as selection server information 308 with said representation host name. The deputy access section 302 accesses that server using this host name. The deputy access section 302 stores in the memory in this management server 301 the information acquired by this deputy access as cache data, and returns this cache data further to a terminal 110. When the access request by the representation host name (www.bbb.aaa) is received next time, this cache data is transmitted to the access request origin concerned.

[0051] By the above actuation, a terminal 110 accesses an information dispatch server indirectly through the management server 301.

[0052] Thus, since deputy access which the management server 301 performs is performed to the optimal server at the event according to this operation gestalt, access in the server group is distributed as a result.

[0053] In the above, although two operation gestalten of the server system of this invention were explained focusing on the whole configuration and actuation, the detail of the server selection section with which a management server is equipped is explained.

[0054] Here, taking the case of the server system shown in drawing 1, the talk is advanced for convenience.

[0055] First, actuation of the server selection section 104 at the time of using the server group control table 105 shown in drawing

7 is explained.

[0056] Although two or more server addresses which they are as a result of [ which was searched considering the representation host name used as the key by name DB retrieval processing (refer to drawing 5 ) and this representation host name as a key ] retrieval are contained in the server group information 107 sent to the server selection section 104 from a name service 102, said representation host name is stored in the server name field 1051 of drawing 7 . Moreover, two or more above-mentioned server addresses which they are as a result of retrieval are stored in the server address field 1052.

[0057] Moreover, although the host name of the server which the server selection section 104 chose is sent to a name service 102 as selection server information 108, about the server address notified for the selection server information 108, "1" (1: advice) is set as the access flag field 1053. In addition, "0" (0: un-notifying) is set up about other server addresses.

[0058] And if the server selection section 104 judges whether the representation host name which the server group information 107 shows exists in the server name field 1051 and this representation host name cannot be found in the server name field 1051 when the server group information 107 is received, it will register into the server group control table 105 all the server addresses (all server addresses contained in the server group information 107) matched with this with this representation host name. At this time, "1" is

set as that access flag field 1053 about one server address. "0" is set to other access flag fields 1053. In this drawing, "1" was set as the access flag field 1053 of a server address 192.128.16.1, and "0" is set up except this.

[0059] On the other hand, the next activity is done when the same representation host name is already stored in the server name field 1051.

[0060] For example, when the content of the server group control table 105 is already set as the condition of drawing 7, while setting "1" as the access flag field 1053 of a server address 192.128.16.4, "0" is set as the access flag field 1053 of a server address 192.128.16.1. In addition, when "1" is set as the access flag field 1053 of a server address 192.128.16.12 located in the tail end, while setting "1" as the access flag field 1053 of a server address 192.128.16.1 located in a head line, "0" is set as the access flag field 1053 of a server address 192.128.16.12.

[0061] When the above processing is performed, "1" which is the set point is visible as if it moved in order in the access flag field 1053.

[0062] Next, the server selection section 104 is notified to the name service section 102 by making into the selection server information 108 the server address stored in the server address field 1052 of the line which set up "1" in the access flag field 1053.

[0063] Thus, if the server to which information dispatch is made

to perform is chosen one after another, access from a terminal will come to be distributed almost uniformly to each server in the information dispatch server group.

[0064] Actuation of the server selection section 104 at the time of next using the server group control table 105 shown in drawing 8 is explained.

[0065] Here, the server to access is chosen according to the load of each server which constitutes an information dispatch server group.

[0066] In drawing 8, about the same component, the same number is attached and explanation is omitted.

[0067] This server group control table 105 is replaced with the previous access flag field 1053, and the description is in a point equipped with the load level field 1054. The information which shows the load profile initiation of each server is stored in the load level field 1054.

[0068] moreover, new in the selection section 104 -- the what server load Monitoring Department 113 is formed. The server load Monitoring Department 113 supervises periodically the load profile initiation of the server (namely, server by which the server address is stored in the address field 1052) registered into the server group control table 105, and sets the load level as the load level field 1054. The load level is beforehand divided into several steps (here three-stage of load levels A, B, and C). The server load Monitoring Department 113 transmits a monitor command periodically

to the server of the server address stored in the server address field 1052, totals the response time, divides the result for any of load level A/B/C being, and, specifically, sets it as the load level field 1054. Here, about the server which does not answer at all to the above-mentioned monitor command, nothing is set up to the load level field 1053. When no servers answer, it is expected that the server is in the idle state by generating of a failure among a maintenance service.

[0069] And the server selection section 104 chooses what has the lightest load from the servers registered into the server group control table 105 in the server group information 107 at the carrier beam event, and notifies it to the name service section 102 by making the address of this server etc. into the selection server information 108. Under the present circumstances, suppose that it excepts from a selection branch beforehand about the server which is not set as the load level field 1053 at all.

[0070] If such processing is performed, access from a terminal will come to be performed to a server with the lightest load at the event out of the target information dispatch server group. Moreover, access to the server which is not working will also be forbidden.

[0071] In addition, when choosing the server accessed according to the load of each server, server SHITEMU may be constituted as shown in drawing 9.

[0072] In this drawing, it acts to each information dispatch server as the monitor of the load of the server, and the load monitor 115

which reports the load profile initiation to the management server 101 is formed in it. The management server 101 collects the load situation reports from each server, and is equipped with the load profile initiation collection section 114 stored in the server group control table 105 by making the result into a load level. Here, about a server without a report, a load level is not set up from the load monitor section 115.

[0073] And if the server group information 107 is received, the server selection section 104 will discover that to which load level information is set out of the server registered into the server group control table 105, will choose from that inside what has the lightest load, and will notify it to the name service section 102 by making the server address of this server into the selection server information 108.

[0074] Thus, if it acts to the server itself as the monitor of the load profile initiation of each server, more exact load information can be acquired.

[0075] As mentioned above, although the various operation gestalten of the server selection section with which a management server is equipped were explained, these are applicable also to the server system shown in drawing 3.

[0076]

[Effect of the Invention] According to this invention, as cures against backup at the time of failure generating etc., since the optimal server for making information dispatch perform is

automatically chosen even if it is the case where two or more sets of the servers which have the same information are prepared, a user can get required information, without being conscious of existence of two or more sets of servers, in order to distribute access from a user.

[0077] Moreover, according to this invention, since the server to which the optimal server for making information dispatch perform is not working, corresponding to the load profile initiation of each server is chosen as outside of an object, a user can access it in the best environment.

[0078] Even if access load moreover increases, the engine-performance reinforcement according to access load is attained by offering this invention only by adding the server which has the same information.

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